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Second Annual Meeting of the American Gas-Light Association.

HELD AT THE POLYTECHNIC INSTITUTE, BROOKLYN, N. Y., OCTOBER 21ST AND 22D, 1874.

[Concluded from page 204.]

SECOND DAY—OCTOBER 22d, 1874.

Mr. Littlehales—I would like to make one remark more. It seems that Captain White has still avoided one of the main points. He says that he is making gas one-third cheaper than it was made by his company before. I would not question him for a single moment. The chances are that before it was badly managed; there was waste—but that does not touch the question of oil versus coal. He says he has made larger profits for the company, and that should be judged as one of the tests in favor of the naphtha process. To my mind it is a perfect farce. I may say that I am in exactly the same position, in reference to that, as Captain White. We are making gas cheaper; we are producing more; we are working with less retorts; and we are making more profits—that point therefore, falls to the ground altogether. It does not touch the question. We want to know the value of oil versus coal, yet we do not know it. He says they are making it cheaper now than they used to; that is no point, because there may have been a great deal of mismanagement, and lots of things we do not know anything about—because he is now making it cheaper than before, does not touch the question.

Captain White—I will say, in reply, that there is only one way for us to get at that. I know what the works in the city are producing per ton of coal; that is the only way possible for me to get at it. The works in the city of Brooklyn are managed by other gentlemen beside myself. There are six of us here. I think four out of the six are engaged in the manufacture of coal gas. They are four gentlemen second to none in our profession for ability. Now, I will take the results of their works, the yield per ton, the standard illuminating power, and cost of manufacture generally. I take that as a basis and make an estimate upon it; and I assert that my claim still holds that I make gas cheaper than they do. I do say that the Citizens gas company and the Peoples gas company, making gas with the use of naphtha, do make and put in their holders a standard illuminating gas cheaper than other companies in the city are able to do. I say, my friend Captain Benson makes 10,400 feet of gas from a ton of coal. I know what it costs him, for I buy the same kind of coal. We make an estimate upon that. I know just as well as Captain Benson does how many men it takes to handle his works. I can judge fairly of all the material used, and of the rebate from the sale of residuals, so an estimate made up in that way gives us the cost of coal gas in the holders. Now, I will make the same quantity of gas, of say same illuminating power, or better, nearly one-third cheaper. My directors have called upon me to make estimates touching upon this very question, and the only way I can get at it, is to say we make 600,000 feet of gas in a day; and making it in the old way, we can only say it will take so many tons of coal, so many retorts, so much purification, and labor proportioned to these large operations. Write these figures down, and say it costs you to put your gas in the holders one dollar, all credits allowed, and you cannot make it any less here. Now make the gas the way I do, and you use less coal and less labor, you use less purifying material, and have everything in your favor in point of wear and tear and repairs. As one-half or one-third of your gas is made from naphtha, which costs 4½ cents per gallon, and a gallon will make 90 cubic feet of 60 candle-gas; we make about 130 odd feet to the gallon, but of course that includes the diluent, of water gas.

Mr. Neal—I have three questions I would like to ask. In the first place, what is the specific gravity of your gas, the weight of it as comparative with ours. Second, if it is, as I understood, much heavier than our ordinary coal-gas, are your consumers obliged to change their burners with large apertures? Third—has the consumption of a given number of consumers fallen off, by reason of this change, giving them a heavier gas? I am told that it has, that their bills are not so large, and therefore there is not so much money coming into the treasury from a given number of consumers.

Captain White—Those are questions that I am perfectly willing to answer. The gravity of our gas is certainly nearly ·130 heavier than coal-gas of a similar illuminating power. Our gas averages between 525 and 600. That this does have an effect upon the consumption, there is no question. We estimate in our district there is about two to three per cent. loss in our consumption. The consumers through our district have, to a large extent, changed their burners; that was done a year ago, when we first commenced our experiments, and used the wrong process, when the gas was very heavy, and contained a large amount of air. I do not use in my own house burners of any larger openings than for ordinary coal gas. The results shown in our district now—and it is a bad season for us, the business houses are suspended from the dulness of the times—but our district shows a steady gain right along in the consumption, as compared with the same months of the past year. So that, while we do lose a certain per cent., we are still gaining something right along. The loss is small and is to be considered as part of the cost. I have not been urging at all upon you the use of the naphtha gas alone. Gentlemen have said here that in using naphtha gas they lost the sale of residuums—that does not follow as we work.

Mr. Neal—I did not refer to the falling off of consumption; but supposing to-day you send out the ordinary coal-gas that you used to make, and a consumer burns one thousand feet to-day, to-morrow you send out the gas that you are now making—will that consumer burn the same amount in a given time? That is the point!

Mr. White—I was endeavoring to answer that. I do not think he will burn within two or three per cent. as much as he did, and I consider that as part of the cost of the gas. If instead of selling a man 100 feet, you sell him 95, this 5 feet ought to be counted out of the cost.

Mr. Sutton—Will your 16 or 17 candle gas be any different from the 17-candle gas of the Manhattan Company in New York?

Captain White—No, sir, I do not think it will. It will take the same burner; a 16-candle gas depends upon its containing certain constituents, in certain proportions; and it don't make any difference whether you put them in one way or another.

I think that I have very fully occupied your attention, and it would be well if I gave way and let Mr. Hyde read his paper on purification.

Mr. Littlehales moved that the committee be especially requested to investigate, and report to the Association, upon the following points, in reference to the naphtha gas process, which was seconded by Mr. Cathels:

1st. The cost per 1,000, for material.
2d. " " " " labor.
3d. " " " " purification.
4th " " " " wear and tear of retorts.
5th The cost per 1,000, for gas at consumer's meters, calculated on gas paid for.
6th The rates of wages.
7th Amount of capital required per million feet annual make, to construct works for naphtha, as compared to that for coal.

Motion carried.

Mr. Edgerton—I have a few remarks to make. There cannot be, of course, any detailed statement made here, of the cost of naphtha gas, or of the mixture of the naphtha gas with other gases, at the price of labor and materials in all other localities. That is out of the question. Every individual has to investigate that with a view of knowing the prices in his locality. Now, I make this statement by which you can make such a calculation for yourself: if you visit the works and see whether the gas is successful, you can inquire the price of the materials, and you can apply those prices there to the prices as you find them at home. I state this again, that the equivalent in the

city of New York, where one gallon of naphtha costs at present 2½ cents, made into a commercial naphtha gas, and distributed; the commercial equivalent, in coal-gas of 15 to 16 candle-power, is 400 cubic feet. In regard to the labor that it requires to make the naphtha gas, you have already had sufficient statements from Captain White, which show the amount that can be made per day. There is the foundation of the thing. You require one gallon of naphtha to make a commercial equivalent, in lighting power, of 400 cubic feet of coal-gas. If anybody has made any experiment with naphtha-gas that differs from this, I challenge the comparison. That, I say, is what I know upon this point. And I also further say, that four years ago, when this question came up, I applied to all the scientific ability in the country in regard to it; I applied, among others, to Professor Wurtz, and in his report is contained the statement of William Farmer, of results of experiments made at the Manhattan Gas-Light Company's and this agrees materially, within a small percentage, with the statement I now make. I have the original of that report of Professor Wurtz, and it is a report of facts that cannot be gainsayed. In applying and trying to find out the price of gas in your various localities, you want simply the fundamental data—that is, the quantity of gas made from a certain amount of material, the illuminating power of that gas, and the labor required to make it. The prices you have to apply in your own localities, at which you obtain the material. The prices made on the Brooklyn gas would not answer elsewhere.

Mr. Harrison—There seems to be a difference of statements as to the equivalent of coal and naphtha-gas, which is worthy of a little more attention. Mr. Edgerton states that the equivalent of one gallon of naphtha gas is 400 feet of coal-gas. Captain White stated that he makes, from a gallon of naphtha, 90 ft. of gas, which, diluted down to the quality of 16 or 17 candle gas, is 130 to 140 feet. Mr. Libby, the president of the gas company, states it about 130 feet. The difference between 130 feet, which is the equivalent obtained by the Citizens gas company from a gallon of naphtha, and 400 feet, which I understand Mr. Edgerton to state, is worthy of the consideration and the attention of the Association.

Mr. Edgerton—That point is well worthy of our attention, and I propose to explain that point. I propose to show that the difference between these results is very easily explained, for this reason. That I stated the commercial equivalent of naphtha-gas, made from a gallon of naphtha, made properly in my opinion from the actual test of that gas, burned in suitable burners, without any admixture of anything whatever—that is, naphtha-gas. Now, Captain White's equivalent is based upon the mixture of other gases. As to those other gases I have not understood their quantities, percentages, or illuminating powers. If I understood these, I might give as I have made in other cases, an estimate of the reduction of candle-power, due to mixture with the various diluents, air, hydrogen, carbonic oxide, and various other gases. But the very moment you commence to introduce into the 400 cubic feet of naphtha-gas, the equivalent of 400 feet of coal-gas, and made from naphtha; the moment any diluent is introduced, whether air or carbonic oxide, there is a change in the lighting power of that gas; of course you cannot get the same amount of light out of it. The estimated reduction can only be ascertained by experiment. If Captain White gets from a gallon 130 cubic feet of combined gas, and that 130 cubic feet of combined gas gives an illuminating power of 17 candles, then the combination has been at the expense of the petroleum gas, to the extent of 50 per cent. of the material. That seems clear and fair. Now this of course must be made the subject of a strict and careful investigation by the committee, and cannot be gone into detail here, but it is for them to work out, and to see how it is done. They will have no trouble, except to go to places where it is done, and see it done, or ask the people who do it how it is done.

Mr. Littlehales—Are the results of Mr. Edgerton literal results? Are th y the results of actual work?

Mr. Edgerton—They are derived from the results of twenty-two gas companies, the practical running by the burning and consumption of 2,000 consumers of the gas.

Mr. Neal—I hope the association will pardon me for rising to make so many motions, but I move that this subject be postponed to the next meeting. We are gasified and assified by the consideration of the subject, and as I am one of the committee who are to report, and if I heard much more, as I said before, I shall be entirely in the dark. Therefore I move that the further consideration of the subject be postponed until the report of the committee at the next meeting. Carried.

It was moved that the association take a recess of fifteen minutes, to partake of a refection furnished by the Brooklyn Gas Company. Carried.

Mr. G. A. Hyde, Engineer of the Cleveland Gas-Light and Coke Company, then read a paper

ON PURIFICATION.

Mr. Chairman and Gentlemen of the Association:—At the last meeting of this association, held at Cleveland, I was requested, and I assented, to prepare a paper on the subject of Purification, to be presented at this meeting. My friend who suggested my name and myself, in assenting, had in view the reporting of the results of a trial of the use of oxide of iron for purifying, as at that time our company had just commenced the use of it. Had I reflected a moment, I should not have assented to write on a subject of so much importance; as an intelligent paper on that subject, to be presented to a body of so learned and skilled gentlemen as this, should be written by a competent chemist, and I do not profess to be a chemist or the son of a chemist.

I will, however, make a statement of the composition of the purifying material we have used in our works during the present year and some of the results thereof. They will not, however, be as thorough or complete as they should be, as sufficient time has not elapsed to arrive at all of the results; and further, I have not, from a press of other duties, been able to give the time to the subject that I ought.

Previous to the present year our company has used the hydrate of lime for purifying, but the offensive odors arising from it, after being removed from the purifying boxes, induced a change to the oxide of iron, as the gases escaping from the iron while ventilating and reoxidizing, are less offensive than from lime.

The composition of the material used was one part iron borings, eight parts sawdust, and three parts of hydrate of lime; the mass saturated with liquid sulphate of iron. The mass is placed in the purifying box in bulk, on a single layer of trays. When foul the mass is removed and spread out, and exposed to the atmosphere for reoxidation. The mass was found to purify more gas on each succeeding trial, until the iron was thoroughly oxidized.

The iron, sawdust, etc., in quantity sufficient to charge all of the purifiers, and a surplus for changing, costs about the same as the lime used for purifying during a period of four months, and after is used without cost except for labor, which, including remass from the purifiers, ventilating, and replacing, is not far from the cost of slaking lime, charging and emptying the boxes, with the same.

These statements of expenses are probably not new to most of you, gentlemen, but having been requested to present them, I do so with pleasure, as I desire to add my mite to the interchange of opinion on the great subject of gas making.

It was moved and seconded, that the paper of Mr. Hyde be received and placed on file, with the thanks of the association. Carried.

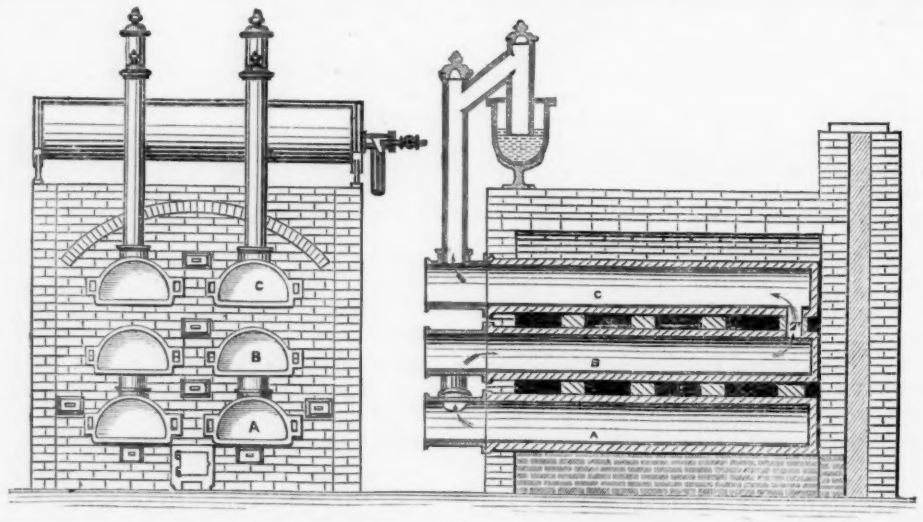
Mr. Clegg—If in order I would like to request a statement from Mr. J. E. Condict, of New York city, on the subject of the manufacture of coal-gas. We are full of petroleum, but I should like to hear something about the new system of making gas from coal alone, as now carried on at Yonkers.

Mr. Condict—Mr. President, and gentlemen of the Association: I regret that the engineer of the works referred to—the Yonkers Gas-Light Company—is not present here to day, that he might read a paper which he prepared, on the process now used at those works. If I had expected to bring this subject before the Association, I would gladly have prepared a paper showing the manner in which the process is carried on. By referring to the diagram herewith presented, you can readily see how the new benches are constructed at Yonkers, and in what respect they differ from the old setting.

I will not take up your time, gentlemen, to go into any chemical analysis of this process, but simply state a few commercial facts, which may serve as a basis for your opinion as to the value of this system.

A bench of six retorts was constructed, exactly as you see on the diagram, in September, 1873, and about the first of the following month it was fired up, and for nine consecutive months, without the intermission of a single hour, was kept in operation. The net results of using Westmoreland coal (with the exception of two tons of Murphy Run coal) in continuous running for nine consecutive months, averaged 12,000 feet of gas, of over 17 candle-power, per ton of coal.

After it had been working thus 2 or 3 months, the engineer of the Yonkers company, Mr. Slade, came to our works in New York and made a test. A week later he made a second, and on the following week a third. These tests not only embraced all the matters pertaining to details of manufacture, the quality and



permanent character of the gas, but also extended to every mechanism employed, within or without the works, from the scales for weighing the coal, to the consumer's meters for measuring the quantity of gas sold.

On his recommendation a bench was constructed at Yonkers. That bench, after running three or four

months, and proving satisfactory, was followed by the changing of the entire works to this process. It is of interest to all of the stockholders in every gas company, and to every gas engineer, to know the simple fact that we can get 12,000 feet of 16 to 17 candle gas out of Westmoreland coal, as against 9,500 feet by the old process. You will notice, by referring to the diagram, that it has a bench of six retorts. The three connected retorts on the right, and three on the left, form two entirely independent series, the lower and middle retorts of each side being connected by a stand pipe, as shown in the drawing, and the middle and upper retorts in the rear, by an opening at the back end, through two saddle-ties placed side by side.

We charge all three of the connected retorts on one side of the bench simultaneously, and at the end of two hours, the three on the other side, and the gas is worked off in the same length of time as under the ordinary process. The candle-power was tested by three separate photometers, and found to average over 17 candles. We had another practical test. The gas was used in several large buildings, and one or two manufacturing establishments that used gas from other gas companies, and it was a common thing for us to go in these places, at the request of friends, and turn off our gas, and turn on the gas of other companies. Thus we had an option of comparing the illuminating power of our gas with that made by the old process, and the comparison fully justifies the assertion that gas made by this process was up to, if not exceeding the standard of that made by either of the other companies. There is no loss in coke; we tested it again and again, and the average we found to be from 33 to 35 bushels of coke to the ton, and of fully the same commercial value as coke from the ordinary way. There is no extra labor involved on the part of the workmen. By the old process you make tar at the expense of the gaseous product. We make only about three to four gallons of tar to the ton, as compared with the old process of 12 to 15 gallons. During the nine months that the bench was in operation, and making during that time more than six million feet of gas, the retorts were not cleaned once, and they are as free from carbon (with the exception of a very small collection in the rear end of the upper retorts) as the day they were placed in the benches.

The first bench constructed at Yonkers has been running six months, without the intermission of one hour, and has not been cleaned once. I throw out these facts that you may see the simple result from this manner of setting, and I shall leave to parties more versed in chemical affairs than I, to give a reason why such results are obtained. I will go still further and state that the Yonkers works, after they had run one bench three months, and experimented very carefully in regard to that bench, as compared with the old works, decided to take down other benches that were nearly new and in good order, and reconstruct them on this plan, believing that they would save the expense of reconstruction (over $1,500) in three months time. The result has proved that to be the case. The cost of building a bench of six retorts by this process, commencing at the foundation, is not as great as by the old. You notice in this two standpipes, and in the old you have six.

To change a bench of the old retorts to this new setting is a matter of very small moment. I feel, gentlemen, that any improvement, coming from what quarter it may, that will add to the quantity of gas, keeping quality the same as it is now, is deserving of investigation. I should be glad to answer any questions from any one.

In reply to questions Mr. Condict made the following statements:

We work by the same heat as by the old process.

We find no obstruction whatever in the rear opening; the opening is from 12 to 14 inches in size, and has never been closed.

We use the same exhauster as in the old works. The entire works, aside from the setting of retorts, is the same as the old process.

We use the long ton in making our estimates.

We have made as high as 14,000 feet, during the entire nine months, averaged 12,000 feet of 17-candle gas; without any enriching coal, and without a pound of coal (excepting Westmoreland) other than the two tons referred to of Murphy Run coal.

I will mention one fact—that the Yonkers works have used only Clover Hill coal (which you know is inferior to Westmoreland) that cost them on the docks $6·50 a ton, and their gas to-day is a little too rich. They get over 11,000 feet from this Clover Hill coal, while we obtained 12,000 feet from Westmoreland.

A simple way to overcome the stoppage is to introduce a little jet of steam in the hydraulic pipe or stand pipe either. They are nine feet retorts; they were 14 by 23 by 9 feet.

We have turned our attention to the difference in the gas that has passed through other meters, and examined that question thoroughly, particularly so by the engineer of the Yonkers works, and there was a loss, a little rising of 5 per cent. between the consumers meter and the station meter.

We had no trouble with naphthaline. I have no doubt that naphthaline generated in any pipe can be easily got rid of by a little steam.

The tar is not as soft as the tar ordinarily is, but it flows off easily. At the Yonkers works it flows through nearly 200 feet, almost level. No obstruction. The ordinary clay retorts cost about $55 each.

The President—Application is made for membership by Mr. Charles H. Simpkins of California, and Mr. W. H. Beggs of San Francisco. They are recommended by Mr. Olney and Mr. White, and the Executive Committee endorse the application. Also, application is made by Mr. Matt Cartwright of the Citizens Gas Company of Rochester; also approved by the Executive Committee.

It is moved and seconded that these gentlemen be declared elected members of the association. Motion carried.

Mr. McIlhenny—Has any place been designated for the next semi-annual meeting?

The President—The place for the semi-annual meeting is left for the association to determine.

Mr. Harbison moved that the next semi-annual meeting be held in the month of May.

In deciding upon a place in which to hold the semi-annual meeting, the following places were voted upon in order: Hartford, Conn.; Cincinnati, Ohio; Indianapolis, Ind.; Dayton, Ohio, and the city of Washington.

Mr. Nettleton—Some of the members who were at the meeting a year ago, will bear in mind that I thought we had better have one meeting a year, and spend our efforts in having one good meeting: At that time it was put to vote and it was a very close one. I still think the same, that if we have one meeting a year, and have special effort, and have a good one, it will make it more valuable to us than going to different parts of the country.

The President—The question before this association is—Shall we meet in the month of May next?

Motion carried.

After balloting on the above named places, the city of Washington was decided upon in which to hold the next semi-annual meeting.

In remarks made by Mr. McIlhenny of Washington, he said that the object of these meetings is to stimulate the members of the association to excel in their profession. Aside from the special character of the gathering, there would be sufficient reason why this association should enlarge and become permanent, and, if I might allude here to the facts, a year ago it came very near dying a natural death, but now the evidences are that it is on a permanent basis, and will remain so for some time at least. Questions of differences of opinion as regards changes or improvements, or whatever they may be, in the manufacture of gas, have nothing to do with the permanency of this organization, and I hope, therefore, that all the gentlemen present, and as many more as will come, will visit Washington in May, and if I am there and alive and well, I will endeavor to extend to them as cordia a greeting as I possibly can.

It is moved and carried, that Mr. McIlhenny, Mr. Cartwright, and Mr. Nettleton, be appointed as a committee of arrangement for the meeting in Washington.

Mr. Stebbins—I want to introduce to the favorable notice of this association, a regulator or steam governor, which is now partially in use; a steam governor that Mr. Nettleton has in use, and others have them; and I would like him to make a statement in reference to it, if it is in order. It is of great practical value to every gas company.

Mr. Nettleton—I suppose Mr. Stebbins must refer to Slade's Automaton Fire Governor. I use one to regulate the fire, and that regulates the exhauster. I will say this, that since I used it my fuel goes 50 per cent. further than it did before. It does its work well. You fill up the fire box with fuel and it takes care of itself. I have no interest in it except as I use it.

Mr. Stebbins—It is a very inexpensive article, and is the invention of a man at Yonkers; and some of you gentlemen will go doubtless, and see the way of making gas that has been mentioned by Mr. Condict, and you will see that at the same time.

Mr. Nettleton—At the last meeting in Cleveland, it was voted that we print in book form the proceedings of the association, from the beginning up to the present time. It was supposed it would cost less than $100, in suitable book form, so as to be kept in the library, and as a nucleus of the future libraries of the association. When we came on to New York we found the expense of 500 copies would be $250, and 1000 copies $285, so we have ordered it, and not only that, but the proceedings of this meeting is to be printed with it; the printing to include the discussions and the papers that are read.

Mr. Harbison moved that the former proceedings and the present one be printed, and that they be limited to two copies for each member—250 copies.

It is moved as an amendment that 500 copies be printed.

The amendment was accepted, which was put and carried.

It is moved and seconded, that the thanks of this association be presented to the treasurer, Mr. De Mil', and that the $100 already appropriated to him is to be received by him for compensation for his services. Carried.

The chairman of the committee appointed to examine into the financial condition of the association, reported that the committee examined the books and the accounts of the association, and found them correct.

It is moved that the treasurer's report be published in the proceedings. Carried;

It is moved and seconded, that a vote of thanks be tendered to the AMERICAN GAS-LIGHT JOURNAL, for the courtesy received from in publishing the proceedings of the association. Carried.

Captain White moved that a vote of thanks be presented to the President, for the able and dignified manner in which he has presided over this Association.

Mr. White moved to adjourn. Motion carried.

The President—I shall be most happy to see you in my works, in the city of New York, and I shall be happy to see you at my house or at my office. The works and books of the Manhattan Gas-Light Company are open to your inspection.

I now declare this meeting adjourned to the second Wednesday in May, at ten A. M., in the city of Washington, District of Columbia.

Subsidence of the Thames.

The shrinking of the waters of the Mississippi and its affluents during the past thirty or forty years, has been very marked, and productive of much inconvenience to the inland navigation of the North American continent; and now we are threatened by a similar

visitation throughout a portion of the bed of the Thames. When James I., in a fit of petulance, threatened a deputation from the city with the removal of his court, one of the members is reported to have said he hoped His Majestey would leave them the river; and this is what the residents between Teddington Lock and Richmond are now saying to the metropolitan authorities. The reduction in volume of the American rivers is doubtless owing to the clearing of the primeval forest; but there has been no extensive change of that sort for many generations over the region supplying the noble river which scatters over the world the products of so many lands, and the equable flow of whose waters, depending on the length of its course and the character of the tract it drains, is referred to by Denham, when he describes it "as strong without rage, without o'erflowing full." Neither can the unwonted shallowness and the numerous shoals that now impede navigation between the points specified be wholly attributed to the late dry summer; while there is good reason to consider at least the greater part of these as indirect and unexpected consequences such as generally flow from a work so extensive and important as the Thames embankment. The narrowing of the river by that stupendous work has increased the rapidity of the current from Westminster downwards, and thereby lowered the stream below Teddington, where the lock system ends; and the residents in Richmond and neighborhood ask that the ancient level may be maintained by means of another weir between that town and London. In the interests of sanitation, harmless recreation, and the picturesque, it is to be hoped that, without detriment to commercial or other important interests, it may be found possible to accede to the request.

The Production of Peat in Germany.

A branch of industry which is gradually increasing in importance has arisen in late years in the barren moorlands of northwestern Germany, by the preparation of peat or turf, the material most in use in the northern part of Europe as fuel for private dwelling houses, and in some cases even for larger establishments. Two companies have lately been formed in Oldenburg for the purpose of making peat on a large scale, and of supplying it to the inhabitants of Bremen, Oldenburg, and other towns around at a far cheaper price than that now paid to the peasants, who have hitherto almost had a monopoly of the trade in this article. The companies mentioned cut the peat out of the soil of the marshy moors or bogs extending from Bremen to the Dutch frontier by machinery, and by this process not only obtain the material in question, but at the same time construct a net of canals, which are of use for conveying the peat itself to market, and which form new and permanent channels of communication, available likewise for all other purposes.

The peat-cutting machine consists of a large flat-bottomed steam-vessel, which, when set to work, is able to cut a canal twenty German feet in breadth and six feet in depth whilst proceeding at the rate of from ten to twelve feet per hour. The soil thus cut out by this floating peat manufactory is lifted into the vessel by steam power, and after being thoroughly ground, is deposited, by means of a long pipe running out of the side of the vessel, alongside of the bank of the canal, where it is subsequently cut into the shape of bricks, and dried. It is stated that by this method about 1,000 centimes (55 English tons) of a very good kind of peat may be manufactured per day. "In view of the present high prices of coals, particularly in Great Britain," remarks Consul Ward, "and of the great importance which attaches to the question of obtaining a cheap kind of fuel at all times, it might perhaps be well worth while to consider whether this system of peat manufacture could not be introduced in many other parts of Europe, where the soil is doubtless as well suited for the purpose as in Oldenburg."

Chemical Repertory.

No. 123.—December 16, 1874.

EDITOR—HENRY WURTZ.

CHEMICAL EXCERPTS.

1299. Packing Butter in Tins.—The Butter and Cheese Exchange lately received a package of Danish butter which had been packed more than seventeen months before, and was in prime condition. The package had been sent here from Bolivia, where it had been sent from London, and was accompanied by a note, addressed to the New York butter and cheese merchants, asking if as good a quality of butter could be produced here; and if so, that New York would soon have control of the trade of the South American markets, as the cost was too great to get their butter direct from London. At a meeting of the merchants, held some weeks ago, it was decided that as good a quality of butter could be made here, and steps at once will be taken to secure control of the South American trade. Wood has heretofore been almost exclusively for packing purposes, but it is to be superseded by tin, which has been tested and found in every way to be superior to wood. It is cheaper, and lighter, and can be handled more easily.

1300. Gas Made, and Sold.—From our London *confrere* we learn that the Chartered Company carbonized, during the past half year, 236,581 tons, and that the gas made was 2,300,386,000 feet, which represents an average make of 9,723 feet per ton. Of this quantity, no less than 8,634 feet per ton were sold; and, allowance being made for consumption on works and at testing stations, it appears that 8,634 feet per ton have been accounted for. This is regarded as extremely satisfactory. By enlargement of mains now in progress, and the admirable plan of laying service-pipes in wooden troughs filled up with pitch, no doubt is entertained the amount of "unaccounted-for" gas will be still further diminished. It is now, however, seen to be a trifle under ten per cent.

1301. Snow in City Streets.—John J. Mullaly and John P. Hawkins, Superintendent of the Machine Department at the American Institute Fair, appeared before the Street Cleaning Committee at police headquarters, and advocated the use of superheated steam in clearing streets of snow. Mr. Mullaly's invention was tried last winter, and consists of a steam generator that rapidly produces superheated steam, conducted to a number of pipes attached to a platform which can be raised and lowered, so that the mouths of the pipes can be placed on a level with the snow. The machine travels at the rate of three miles an hour, and covers a street section six feet wide. Mr. Mullaly wishes the Police Board to appropriate a sum out of the street cleaning fund to build a machine, to be tested this winter and bonded in the following estimates of cost:

Boiler, $1,000; tank, $225; carriage, $500; engine and blower, $500; steam-gauge, injector, etc., $150; distributing apparatus, $100; horses, harness, etc., $700; extra horses, 1,200; contingencies, $625—total, $5,000.

The apparatus would weigh 6,436 pounds, and the cost of maintenance for 105 days, viz., from December 1 to March 15, would be $5,974.50. Other estimates showed that it would cost $11,647·03 per mile to remove snow by carts, and $1·723·41 per mile to get rid of snow by the superheated steam.

[It seems that no funds could be commanded for the experiment.—Ed.]

1302. Cost of Stoves.—Persons familiar with the cost of castings have wondered what there was in stoves over similar fabrics of iron to make them so expensive. Compared to other articles of necessity in household use, they are exorbitantly high. They last no longer, and ought to approximate in price to other utensils. The life of a good stove is from five to ten years, according as it is used. The *Iron Moulder's Journal* gives some facts as to the cost of making stoves which are of general interest. John S. Perry, of Albany, calculates that a gross ton of iron will make 2,120 pounds of clean castings; which would furnish seven stoves of 300 pounds each. Cost of moulding per 100 pounds is $1·37½, which would make the cost $4.12½ for moulding. No. 1 foundry iron was quoted in September 10 at $30 per ton, which would make the iron in a 300-pound stove cost $4 28; the net cost for the stove in question being $8 40. Such stoves are sold at $28 and $38.

1303. Coke.—The value of coke as a fuel and as a means of economy of coal is hardly appreciated sufficiently. A mixed fuel of soft coal and coke is invaluable for the ordinary purposes of heating, and still more for those of cooking, as it absorbs the smoke or inflammable gases given off by coal during combustion, and renders the fire brighter, cleaner, and hotter than it can be made by any other means. After the fire has drawn up, coke may be added in small lumps (not in large masses), either alone or mixed with coal. A fire made in this way is better for not being stirred, so long as there is space between the fragments of fuel for a free current of air.—*Ironmonger.*

1304. Carbolic Acid as a Beverage.—A lady named Clark, living in Orange County, in this State, came to her death suddenly at Ballston Spa, during the last summer. Mrs. Clark took a drink of one of two bottles which were on the mantelpiece, supposing that the one from which she filled her glass contained water from the mineral spring. The liquid, a full glass of which she swallowed, was carbolic acid, which had been sent by a doctor, to be used in the preservation of a corpse. The unfortunate woman, soon after taking the drink, remarked to her sister, Mrs. Billings, on the strangeness of its taste. Mrs. Billings thereupon took a swallow from the bottle, and immediately exclaimed, "Why, this is acid you have been drinking." A physician immediately summoned, did all in his power, but in vain. Half an hour after taking the drink, Mrs. C. died. Mrs. B. was very sick, and vomited freely, but recovered. The bottle containing the acid and the bottle containing the mineral water were placed side by side and similar in appearance.

1305. The Good Old Times, before Gas-Lighting.—If stringent regulations of a paternal order could insure everybody's good behavior, the denizens of Old London ought to have betaken themselves to their nightly rest, sure of slumbering undisturbed. To blow a horn or to whistle a tune out-of-doors, after 9 o'clock at night, entailed imprisonment for the offender, and any man so lost to decency as to beat his wife or servant, causing thereby a sudden outcry in the still of the night, was liable to be fined 3s. 4d., for indulging in that amusement at an unreasonable hour. Decent people, who rose at dawn, dined at 9 in the morning, and supped at 5 in the afternoon, were expected to go to bed at curfew; so, while every honest citizen was required to hang outside his house a lantern "with a candle in it"—dishonest ones being allowed by implication to keep their doorways dark—his liability that way only lasted from 6 to 9. After that hour the streets were surrendered to darkness, with the natural consequence of making London a somewhat unpleasant abiding-place for folks who had anything to lose, since their houses were in danger of being plundered by ruffian bands, a hundred strong, there being no Police to say them nay; these minions of the moon finding their vocation so profitable that when one of them happened to be caught he was able to bid 500 pounds of silver for his life.

1306. Natural Gas, and Dr. Franklin.—The Philadelphia *Ledger* puts it as thus:

A curious fact is that in 1764, Dr. Franklin, or his friends, "struck oil" without knowing what it meant.

Gentlemen in New Jersey informed him that by applying a lighted candle to the surface of certain shallow brooks or ponds, the flame would catch and spread on the surface of the water. Of one of the experiments, made near Princeton, Dr. Franklin writes:

"The flame was so sudden and so strong, that it catched his ruffle and spoiled it, as I saw."

Dr. Franklin imagined that "something like a volatile oil of turpentine might be mixed with the waters from a pine swamp," but was not quite satisfied with this supposition. The Doctor took this story to England with him, but "it was not much attended to."

[Of course it was marsh-gas that Doctor Franklin struck, and not oil—ED.]

1307. A GOOD INVENTION.—Among the novelties in the way of machinery on exhibition at the Franklin Institute Fair, Philadelphia, we may mention a revolution indicator, exhibited by Edward Brown, 311 Walnut street, Philadelphia. This instrument shows at a glance, by the height of a column of mercury, the number of turns per minute made by a steam engine, without either counting or using a watch. It differs from the engine counter commonly used, which registers continuously the turns made per hour or day, but does not indicate the speed at any instant of time, simply by inspection, as does the revolution indicator. There are many engines which have to run at varying speeds for different operations, also engines controlled entirely by hand; for such the revolution indicator will be found particularly useful.

1308. BROOKLYN WATER-WORKS IN DANGER.—The Commissioners of the town of New Lots, East New York, are extending Fulton street, and workmen are now grading the line of the roadway. Three water mains, by which the city is supplied, cross the street. The Commissioners notified the Board of City Works of Brooklyn to protect the pipes, and an examination shows the contemplated change would cost the city $8,000, besides endangering the water-supply. The corporation counsel has therefore begun an action against the commissioners, and Judge Gilbert granted an order to show cause against them, returnable on the 19th of November, stopping all further work about the water mains in the meantime.

1309. BRITISH GAS-PATENT.—W. J. Warner, Gas Works, South Shields, Durham.—Gas retorts, with apparatus for charging and discharging, consists in building the retort benches in a circle, or segments of a circle, and arranging the retorts in sections of six and tiers of three or more or less, the furnaces for heating being fired from the outside. The retorts are about 12 feet in length, and open at both ends. The retort house is built in a circle, and has a gallery running round it on the inside over the retort benches. On to this gallery the coals are elevated in trucks which are tipped into a large hopper occupping the centre of the inner circle. The coal from thence is drawn into a chamber beneath the hopper by an archimedean screw. From the chamber the coal falls into shoots depending from it into scoops which are made somewhat more than twice the length of the retorts. The scoops are mounted on a frame which extends from nearly one side to the other of the inner circle, and revolves upon an axis which is common to the frame, the shoot chamber, and the hopper. Attached to the frame is an engine for giving motion to the different parts of the apparatus. The hopper being supplied with coal, the frame is brought opposite to the retorts to be operated upon. The lids are then opened either by the engine acting upon a system of levers or by hydraulic power through the intervention of an accumulator. The scoops are then driven into the retorts, and as they proceed the front halves force themselves under the coke of the previous charge and carry it forward and out. At the same time the rear-end halves of the scoops are being filled with coal from the shoots. A continuation of this progressive movement will carry the coal into the retorts, and as soon as the scoops have entered a certain distance, an arrangement is brought into action whereby the scoops are turned over, thereby depositing the coke on the floor, or into a receptacle placed to receive it, and the coal in the retorts, where, on the scoops being withdrawn, and the lids closed, it is left to distil. The frame may then be moved to the next section and the operation repeated.

1310. FRENCH INVENTION.—Dr. E. Budde, of Auteuil Paris, has patented in England a method of preserving eggs by means of carbonic acid, and alkaline silicates. —In this process the gases contained in the eggs are replaced by a scentless gas that cannot be respired, preferably carbonic acid, but hydrogen, or a mixture of these gases may be used. The substitution is effected by evacuation or by diffusion. To effect the fisst, the eggs are placed in a strong closed vessel, a vacuum is produced, and the gas admitted. To effect the second, the eggs are placed in contaat with the carbonic acid under ordinary pressure for from twenty-four to forty-eight hours. The shells of the eggs are then steeped in a solution of silicate of soda or of potash and when withdrawn are left to dry. In treating perfectly fresh eggs the preparatory operation is not needed, as steeping them in the solution suffices.—*Iron.*

1311. GAS-WELL ITEM.—Messrs. Reis, Brown, and Berger, of New Castle, Pennsylvania, have succeeded in drawing a fine supply of gas from the new well near their works. It is now flowing through a two-inch pipe, and it is said to be strong enough to light two or three such towns as New Castle. The firm however are boring still deeper.

1312. RURAL SANITARY MATTERS IN ENGLAND.—A recent English work by G. W. Child, states that it is really the exception to find in country districts a water supply which is at once plentiful and wholesome and even tolerably accessible to the people. In a a large number of towns and villages the drinking-water in use is in the very foulest condition.

The *Chemical News* comments—

All this we can fully confirm from our own observation. We fear that the drinking-waters of the fen districts, and the eastern counties generally are even worse than those which our author has met with in his district.

The cottages from a sanitary point of view, are even worse. "I have entered many," says Mr. Child, "almost clammy, and noisome. I have constant cases brought before me in which six, eight, or ten people are sleeping in one such room as I have now faintly described."

His observations on the propagation of fever, and its evident close casual connection with nuisances, are very valuable. We find a curious instance where two petroleum barrels had been buried in the earth, and where a chain of wells extending over a distance of 180 yards were in consequence tainted with the nauseous flavor.

Gas Stoves versus Kitchen Ranges.

At present the gas made from coal or petroleum, thus far extensively used for the illumination of streets and houses in cities, is becoming a powerful competitor with other fuel for heating purposes. There is indeed a great advantage in a stove which is always ready to burn by the simple turning of a stop-cock and the application of a match; such stoves are especially useful for cooking purposes, while for heating rooms even the flame of burning logs has been imitated, by making them of enamelled iron, hollow and perforated with holes, out of which the gas escapes, and being ignited, imitate the old fashioned burning wood-pile on the hearth so well that the illusion is perfect. The only objection is that the flame is too regular, and that the family sitting around the hearth is deprived of the occupation of arranging the burning logs by means of tongs, piling up fresh logs, removing ashes, etc.

Against the use of gas for ordinary purposes no possible objection can be made; a gas cooking-stove is in all respects far superior to any other of whatever kind, there is no kindling necessary; it burns at once; the fire never goes temporarily down, as is the case with stoves burning coal when neglected, or when fresh fuel is added; but the heat is always constant, and may be increased or diminished by the simple turning of a stop cock; no necessity of bringing fuel from the cellar, nor carrying ashes to the ash barrel; and every one who has ever tried this kind of stove is loud in its praise. The editor is entitled to testify in this regard from his own experience, as for many years such stoves have been used in his household during every summer season, and even in winter when suddenly heating of water or cooking was unexpectedly required, while the kitchen range was insufficient or without fire. He has tried several kinds which are offered in the trade, and can give a favorable opinion of most all of them.

An ordinary gas flame, as used for illumination, blackens the pot placed, for the purpose of heating, over it, and this is doubly objectionable; first, the coating of carbon or lampblack formed retards the heating effect; and secondly, what is worse, this black coating is an unbearable nuisance, dirtying everything around, therefore the gas has to be burned in such a way that it will not deposit carbon, and this it will do when burned so that the flame is not luminous, in which case a secondary advantage is gained, namely, it gives more heat; the light under which the ordinary style of combustion is given off appears to change into heat, so that for less light we gain more heat.

There are three methods of accomplishing this:

1. To let the gas escape from a great number of small holes, so that instead of one or a few large flames, we have many small ones.

2. To burn the gas after being mixed with air on top of a tube, in the style of the so-called Bunsen burner.

3. To burn the gas after being mixed with air over a wire gauze. This last is the most common way of our American gas-cooking stoves.

We have in use a roasting and baking oven, the construction of which may be easily understood without a figure. It consists simply of a double sheet-iron box of cubical form, with doors in front; half way up is a square horizontal disk, made of two plates of sheet iron, distant about half an inch, and joined at their edges. This disk, which separates the oven into two halves, an upper and a lower, is at the lower side full of small holes, out of which the gas escapes, and when ignited, forms so many little blue flames that the lower surface represents all one single glow of heat. This heat radiates down on everything placed in the lower division, while in the upper division things are heated from below. The method to roast in this oven is to place the meat, goose, chicken, etc., first in the upper division, where the heat is less but more general, until well done, then it is transserred to the lower division until done as brown on the surface as desirable.—*Manf. and Builder.*

New York City Estimates for 1875.

We extract such items as may interest our readers from the documents that Commissioner Van Nort has transmitted to the Board of Estimate and Apportionment.

Aqueduct repairs and maintenance.....	$685,000
Appropriation for 1874.....	125,000

This account includes the salaries of superintendents, watchmen, mechanics, laborers, etc., on forty miles of aqueduct and reservoirs of a capacity of 4,700,000 gallons, the supplies for the pumping engine at the high-service reservoir, the materials required for ordinary repairs, and the renewal of the six-foot pipes on Eighth avenue and in Nineteenth street, which convey the water into the reservoir in Central Park, and are liable to constant breaks.

Free floating baths..... $10,000
Appropriation for 1874..... 9,000

The two existing baths have been in use for four seasons, and are showing signs of decay, especially in the portions which are under water. They can only be kept in serviceable condition by extensive repairs, including the building of new bottoms, which cannot be done unless the appropriation is fixed at the full amount asked for.

Lamps and gas, old wards..... $685,000
Appropriation for 1874..... 650,000

The cost of lighting the public lamps is calculated at existing contract prices, and at these rates there there will be a deficiency of about $1,000 in the appropriation for this year. The number of public lamps will be necessarily increased in obedienee to ordinances of the Common Council calling for the erection of new lamps, it being estimated that about 500 new lamps will be erected during the coming year. The cost of erecting new lamps, resetting old lamps removed on account of improvements in progress, and repairing and keeping in order all public lamps, is estimated at the lowest figures. An additional charge on this appropriation is created by furnishing gas for county offices, formerly paid out of county appropriations.

Lamps and gas, Twenty-third and Twenty-fourth wards..... $130,000
Appropriation for 4874..... 124,000

Contracts for lighting the public lamps in these wards were in existence at the time of annexation, and were made for ten years from January 1, 1871. At present rates there will be a deficiency in this year's appropriation of about $1,500. It is calculated that about 100 new lamps will be erected in this district during the coming year, and extensive repairs to the old lamps will be required, as no repairs can be made on account of the inadequacy of the appropriation.

Public drinking hydrants..... $7,500
Appropriation for 1874..... 5,000

Since the introduction of public drinking hydrants they have continuously grown in public favor, and are considered a great public benefit. The appropriation for the current year is barely sufficient to keep in order the existing hydrants, and the increase of $2,500 will be necessary to erect new hydrants, in obedience to ordinance of the Common Council.

Repairs to wooden and concrete pavements. $50,000
Appropriation for 1874..... 50,000

The system of replacing the worn ont wooden and concrete pavements with stone blocks will be continued during the coming year. The area of wooden and concrete pavements is 446,000 square yards, one-third of which are in need of renewal. With the above appropriation only the most urgent repairs can be made.

Repairs to stone pavements..... $100,000
Appropriation for 1874..... 100,000

The area of cobble-stone pavements is 1,559,000 square yards; stone-block pavements, 2,648,000 square yards; total, 4,267,000 square yards. The engineers of this department estimate that one-tenth of the cobble-stone and one twelfth of the stone-block pavements require to be relaid during the coming year. It is apparent, therefore, that the above amount will be necessary to cover the most needed repairs.

Repairing and renewal of pipes, stop-cocks, etc., etc..... $90,000
Appropriation for 1874..... 85,000

Upwards of 400 miles of Croton water-pipes, varying from four to forty-eight inches in diameter, are now in use for the distribution of Croton water. A large portion of those below the old distributing reservoir have been over thirty years in use, and require frequent repairs and renewal. There are also over three thousand fire hydrants, and a very large number of stop-cocks which require constant attention. The stictest economy cannot prevent a gradual increase in the expenditure on this account in proportion to the extension of the Croton pipe system and the increase in the decay of old pipes aud stop-cocks from rust.

Roads and avenues and sprinkling..... $25,000
Appropriation in 1874..... 25,000

The travel on the unpaved roads and streets in the upper part of the city increases from year to year, and a due regard for the convenience of the population in that district, and for the accommodation of traffic and pleasure travel. requires that they be kept in good condition as heretofore.

Potable Water.

The importance of pure water for drinking purposes is beginning to be quite generafly understood, and water which possess an unpleasant taste or odor, or contains visible impurities, is rejected as unfit for use. Unfortunately, taste, smell, and color, do not always indicate whethor it is wholesome or not. Water contaminated by the worst poisons, or containing the germs of disease and pestilence, may not give any outward indications of danger. Muddy water, with a repulsive, bitter taate, is not always injurious to health, and sulphur waters, with an abominable odor, are harmless, but a good drinking water should generally be transparent and free from taste and smell.

Perfectly pure water does not exist in nature, for the solvent power of water is such that it takes up more or less of every substance with which it comes in contact. Water that has percolated through the soil for a considerable distance and afterward bubbles up in sparkling springs or is reached by deep wells, contains a considerable quantity of mineral matter, more if the rock is calcareous, less if granitic. Surface water, which constitutes a large bulk of the river water, and is found in shallow wells, contains much less mineral matter than spring wter. Hard water, as water which contains lime salts is called, is not generally considered unhealthy, and to most persons the taste is more agreeable than that of soft water. It is especially preferred for making tea. Carbonic acid gives life to water, as well as wine, and hence spring and well waters are more agreeable than river or brook water, nor is this injurious to health. The most important, because the most dangerous, impurities are those of animal origin.

Many, if not most, cases of typhoid fever and dysenteric epidemics might be traced to water contaminated by animal excreta. During the past summer several cases of sicknes, some of whlch terminated fatally, occurred in a large hotel at Lake Mahopac. Contamination of the drinking water was found to have been the cause. Many times, where whole families have been stricken down by what was called a "mysterians dispensation," defective drains have permitted sewage to enter the wells, and thus spread the germs of typhoid.—*Journal of Applied Chemistry.*

The Columbia Conduit Company,

EFFORT TO GET UNDER THE WEST PENNSYLVANIA RAILROAD.

Since our last accounts, the Columbia Conduit company filed a bill in equity against the Pennsylvania railroad company, the Western Pennsylvania railroad company, James McC. Creighton, Andrew McPheeter and N. H. Miller. Having failed hereto fore to get their pipes laid under the West Pennsylvania railroad tracks, the conduit company recently purchased a strip of ground, fifteen feet wide and two hundred and fifty feet long, in Indiana township, and bounded by the northwestern line of the Pittsburgh and Freeport road, by the Allegheny river and the property of Mary Kirkwood, in the valley of Power's Run, which empties into the Allegheny river. The West Pennsylvania road crosses the run. The Columbia company are now engaged in laying a three inch branch pipe to connect with their iron tanks at Montrose, and in order to do this they are laying the pipe under the bridge of the railroad company, in the bed of Power's Run.

The plaintiffs in their bill set forth that the laying of the pipe upon property which they own in fee simple cannot in any way do any damage to the property of the defendants; that the lot or piece of ground over which the pipe passes is the natural bed of the stream, and that the possession of the same was never held by, nor was the title for the same ever held in the State of Pennsylvania as owner of the Pennsylvania canal, nor in the Pennsylvania railroad company as vendee of the public works of the Commonwealth, nor in the Western Pennsylvania railroad as vendee of the Pennsylvania railroad company, nor in the Pennsylvania railroad company as lessee as aforesaid, but the title was granted by the State to Joseph Jessup, who conveyed it to Archibald Kirkwood. The latter dying, left it to Mary Kirkwood, who, on the 15th of September, 1874, deeded it to the plaintiffs. The company set forth further that the defendants threaten, and if not restrained by an injunction, will interfere with the laying of the pipe, and destroy the same. They therefore ask the court to issue an injunction restraining the defendants and their agents and employees from interfering in any way with the laying, operating, and maintaining of the pipe.

No time has yet been fixed for hearing the argument.—*Pittsburgh Com., Oct.* 20.

LATER.—The current news of the day brings us the following on these difficulties:

A special despatch from Huntington, Pa., dated December 6th, gives the following particulars regarding the attempt of the Columbia Conduit Company to lay an oil pipe beneath the track of the West Pennsylvania branch road at Power's Run:

Since the pipe was torn up, on Friday, a force of 100 men under Colonel Creighton have been encamped on the spot to prevent an attempt to relay the pipe. December 5th, in obedience to instructions, nearly 500 machinists, laborers, and carbuilders assembled at the depot in Altoona, and started in a special train to reinforce their friends at Power's Run. The party are armed, some of them having military equipments obtained in Hollidaysburg. The Oil Pipe Company is reported to be backed by the Baltimore and Ohio railroad company, who own the Pittsburgh and Connellsville railroad, and claims power to lay pipes from the oil regions into Allegheny County under a speculative charter which was passed by the Legislature several years ago. The Pennsylvania railroad company will not permit their tracks to be crossed or interfered with until the validity and powers of this charter have been defined by the courts. It is surmised that the reinforcements sent were intended to meet an expected attack of the oil men on the 6th.

Safety Lamps.—In a recent mining report in the London *Mining Journal*, we find the following:

An extraordinary occurrence has taken place at the Addison Pit, Stella. The workings in the Brockwell seam have, it appears, been some time advancing towards some old workings supposed to be filled with water, and, of course, borings were made in advance to prove and run off this water; however, on Monday week the men holed into the old workings by means of the bore rods, but instead of meeting with water a large quantity of inflammable gas burst out with great violence, and although the men were working with Davy safety-lamps they proved in this case to be no safeguard, for the current of gas filling the lamps internally with flame also forced the flame through the gauze, and the face of the drift being filled with flame the brattices and coal were thus set on fire. Fortunately the men escaped without injury, and afterwards a dam was built up, so as to separate the fire from the other extensive workings, and it is hoped that the fire will be thus extinguished. This case ought not to be lost sight of by mine owners and managers. It is evident that the Davy lamp is not suitable for use when sudden and violent eruptions of inflammable gas may be expected. In such cases the Stephenson lamp is no doubt the safest, as when it becomes filled with gas the light is extinguished, and there is no further danger.

McKean County Coal.

It is now a good while since we gave some analyses of these coals; and urged their further investigation. We now clip the following from an exchange:

"Buffalo, N. Y., has organized an enterprise which will be beneficial to Pennsylvania's interests, and which may largely increase her coal business. A few weeks ago a party of engineers and merchants visited McKean and Elk counties. in this State, and, after examining the deposits of bituminous coal found there, returned to Buffalo and organized a company to mine the coal from sixteen thousand acres of land which they had secured. The capital stock is one million of dollars. and was all subscribed in one day by twenty-five subscribers, seventeen of whom are residents of Buffalo. The coal lands are about one hundred and five miles from Buffalo, and within about nine miles of the line of the Buffalo, New York and Philadelphia Railroad, with which a contract has been made for the transportation of the coal at a fixed rate for the next ten years. A branch railroad is to be constructed immediately, and two hundred houses for miners and other necessary buildings will be erected without delay. The principal supply of coal for Buffalo is now carried about two hundred miles by rail, and with a saving of one hundred miles on a road of easy gradiy ents, it is expected that the cost of the coal will be greatly reduced after the opening of the mines. Engineers estimate that only three out of six workable veins of coal in McKean county, will have to be opened within the next thirty years to supply all the demands."

Breeze Coke.

A new industry has sprung up in Pittsburgh in the last year or two, that gives employment to quite a number of men, and at the same time utilizes one of the waste products of our mills, which heretofore has been thrown away as useless. The technical name of the article is "Breeze Coke." The ashes from the furnace ash pits are hauled into one place, and the first thing to do is to separate the larger particles of coke from the finer ashes by the use of a rake. They are then placed in a large tank of water, and all the coke that is fit for use floats on its surface, while the heavy ashes and cinder fall to the bottom. The breeze coke is then taken off the surface and any light cinder that did not sink. taken out by the hand, when the coke is ready for market. It is used principally by blacksmiths, and as the best article known for a forge fire.

Messrs. Lewis, Oliver & Phillips use one hundred and twenty-five bushels a day for their forges, for which they pay about five cents per bushel, having furnished the ashes for them free, and allowing the breeze washers to sell all that they do not use, for their own profit. Mr. Rodgers, of the firm of Rodgers & Day informed us that the company shipped a car load a week into the State of Ohio, beside furnishing many of our local shops with them, while other firms have shipped three car loads per week. As most of the shops are at present doing but little, the Breeze Coke business of course is not brisk, yet the three firms that are operating in the city find ready sale for all they can make. Mr. Schultz, the Carson street bridge builder, uses a large amount of this coke for his forge fires. The price ranges from six to six and a half cents per bushel.—*South Side Ledger.*

Gas on German Railroads.

Following the American example. one of the Prussian railways has used gas for about a year. The experiment has been so successful that there is little doubt of the ultimate exclusion of all kinds of oil lamps on the railways of Germany. The gas is manufactured expressly for the purpose from oil, being a richer hydrocarbon than common street gas. It is compressed to six atmospheres in cylindrical receivers five feet long, and from sixteen and a half to twenty inches in diameter. If more than two receivers are to be connected, the connecting tubes are of one-fourth inch bore, very strong. A regulator is introduced intermediate between the burners and the receivers, in which the requlsite low pressure is maintained so steadily that all the tremors and shock to which the cars are subject, produce no perceptible effect upon it. This regulator consists of a cast iron circular vessel ten inches in diameter and six inches in height, the open top of which is closed gas tight by a flexible membrane loosely stretched. The middle point of the membrane is armed with a metal disk, connected with a lever acting on the supply valve communicating with the gas holder. The weight of the membrane and its connections is made sufficient to furnish all the pressure needed to maintain the efflux at the burner. When the supply in the regulator is low, the supply valve is opened by the depression of the membrane. As the gas streams into the regulator the membrane rises, and the supply valve is gradually closed. The illumination is thus maintained even more steadily than the gas jets in the cities, though the pressure in the gas holders of course gradually falls off. A single burner af six to nine cubic feet capacity will supply a burner for forty-five to sixty-seven hours. The intensity of the light, by photometric determination, is equal to that of ten candles, while that of ordinary coal gas, burnt at the same rate and under similar circumstances, is but about three and a half candles. The burners in actual use give about seven candles light; the Argand lamps usually employed give a light of only four candles. The whole apparatus, except the burners and their protecting lanterns, is placed beneath the cars. There seems to be no possibility of danger from its use, except such as might result from explosion.—*Professor Lesley's R.R. and Mining Register.*

A Knowing Engine.—The Corliss pumping engine for the Providence water works is a marvel of automatic self-regulation. The problem of dispensing with a second reservoir or stand-pipe for high service, the Corliss Company has solved by the construction of a unique "table engine," capable of pumping 5,000,000 gallons of water per diem, or more if needed. That is to say, if every outlet from the snpply pipes distributed over the high service of the city were closed so entirely that no water whatever escaped, the pumping apparatus remains perfectly at rest, but the instant any appreciable outflow occurs, the machinery, with no human eye intervening, proceeds to supply the waste. It has been known to be over five and a half minutes in making a single revolution, moving regularly all this time, however, and capable of increasing this rate almost immediately to more than thirty revolutions a minute—and all that of its own accord.—*Scientific Press.*

Advertisers Index.

☞ In looking for advertisements, see figures 1 to 12, within brackets, at head of advertisement pages.

GAS BURNERS, APPARATUS, ETC.

American Meter Co.—West 22nd st., N. Y., Arch and 22d st., Phil., 23 West st., Boston..... 11
Agency for the Gibson Improvement—W H. Grenelle, 42 Pine street, N.Y..... 10
Cast Iron Gas and Water Pipe—S. Decatur Smith, York and Meyer streets, Phila., Pa..... 8
Cast Iron Gas and Water Pipes—R. D. Wood & Co., Philadelphia Pa..... 10
Cast Iron Gas and Water Pipe—Jno. McNeal & Sons, Burlington, N. J.. 8
Franklin Foundry and Pipe Works—Jas. Marshall & Co., 23 Nineteenth street, Pittsburgh, Pa.. 2
Gas Valves (Chapman) 75 and 77 Kilby St., Boston, Mass... 3
Gas-Burners—C. Gefrorer, 259 Commerce street, Phila., Pa 9
Gas Purification—St. John and Cartwright..... 5
Gaylord Iron and Pipe Company—90 and 92 Broadway, Cincinnati, Ohio..... 9
Gas Meters, etc.—Harris, Griffin & Co., 12th and Brown streets, Phila., Pa..... 10
Works upon Gas—D. Van Nostrand, 23 Murray street and 27 Warren street, N. Y..... 9
West End Supply Company—Chas. H. Brown, 25, 27 and 29 North 20th street, Phila, Pa..... 4
Gas Meters, etc.—Wm. W. Goodwin & Company, 1012 Filbert street, Phila, Pa..... 12
Gas Meter Manufacturers—Harris & Bro., 1117 Cherry st., Philadelphia, Pa..... 11
Gasometers, Etc.—Geo. Stacey & Co., Cincinnati O..... .....
Gas Fixtures, Etc.—Archer & Pancoast Manufacturing Co. 67 Greene Street, above Broome, N. Y..... 2
Gas Fixtures, Etc.—Mitchell, Vance & Co., 597 Broadway.. 7
Gasholders, Etc.—Delly & Fowler, 39 Laurel st., Phila., Pa.. 4
Gas and Water Pipes—B. S. Benson & Son, 68 B'way., N Y 5
Gasometers, &c.—Keystone Iron Works—2132 Filbert st., Philadelphia..... 2
Gas Screens—American Gas Screen Manufacturing Co., Haverhill, Mass..... 4
Jersey City Gas Meter Works, 14 Morris st., Jersey, N. J.... 8
Lime Hurdles.—Manhattan Lime Hurdle Co., Geo. W. Day, Treas., No. 3 Railroad Square, Haverhill, Mass..... 2
Lava Tips and Scotch Tips—Charles H. Meyer & Co., 227 Chestnut street, Phil. Pa..... 8
National Tube Works Co., 78 William St., N. Y..... 7
Patent Conically Slotted Wood Trays—John L. Cheesman, 147 and 149 Avenue C., N. Y..... 4
Patent Gas Exhauster—Smith & Sayre, 95 Liberty street.. 4

GAS COALS.

Cannelton Coal Co. of West Virginia—J. Tatnall Lea, 325. Chestnut street, Phila, Pa..... 3
Despard Coal Co.—Parmelee & Bros., Agents, 32 Pine st., New York..... 7
Gas Coals—Bird, Perkins & Job, 27 South st., N. Y. 7
Monongahela Gas Coal—56 Exchange Place, Baltimore, Md. 6
New York and Cleveland Gas Coal Company—384 Penn Avenue, Pittsburgh, Pa..... 6
Ohio Gas Cannel—G. Merryweather, Pine cor. Wm. sts.
Peytona Cannel Coal—S. E. Low, 58 Broadway, N. Y..... 6
New York..... 3
Red Bank Mining Company—Bird, Perkins & Job, 27 South st., N Y..... 7
Sterling Coal—Freeman Butts, Cleveland, Ohio..... 6
The Newburg Orrel Coal Co.—Chas. W. Hays, Agent in New York, Trinity Building, 111 B'way, Room 7. 6
Tyrconnell Gas Coal—52 S. Gay Street, Baltimore, Md..... 6

FOUNDRIES.

Atlantic Dock Iron Works—John P. Kennedy, Office 98 Liberty street, N. Y., P. O. Box 2348.....
Cast-Iron Pipes and Fittings—B. S. Benson, 52 East Monument street, Baltimore, Md.....
Continental Works—T. F. Rowland, Greenpoint..... 6
Camden Iron Works, Camden, N. J.—Jesse W. Starr & Sons 5
Gloucester Iron Works—J. P. Michellon, Sec., 6 North 7th street, Phila., Pa..... 4
National Foundry and Pipe Works—Wm. Smith, Carroll, Pike, Smallman & Wilkins streets, Pittsburg, Pa..... 6
Pascal Iron Works—Morris, Taskar & Co., Philadelphia.... 12
Providence Steam and Gas Pipe Co., Providence, R. I.—H. A. Branch, Agent..... 3

WATER METERS, PUMPS, ETC.

Cast Iron Pipes for Water and Gas—Riley A. Brick, 112 Leonard street, N. Y..... 10
Valves for Water, Steam and Gas—Ludlow Valve Man'g Co., 940River street, Troy, N. Y..... 6
Water Pipes, etc.—S. Fulton & Co., 412 Walnut st., Phila... 7

CLAY RETORT WORKS.

B. Kreisher, Clay Retorts, etc., 58 Goerck st., New York.... 8
Cheltenham Fire Brick and Clay Retort Works—Evens & Howard, 916 Market street, St. Louis, Mo.... .....
Jersey City Fire Brick Works—J. H. Gautier & Co., Greene, Essex and Bergen sts., Morris Canal Basin, N. J..... 8
Manhattan Clay Retort Works, 15th st., near Av. C, N. Y.. 8
Philadelphia Fire Brick Works, Vine and 23d sts., Phila.... 8
Retorts, Etc.—Geo. C. Hicks & Co., Baltimore Md.....

LAMPS, STOVES, PETROLEUM, ETC.

Patent Lamp Post—J. W. Graham, Chillicothe, Ohio, or A. M. Callender, office of this Journal..... 9

MISCELLANEOUS.

Analysis and Testing of Gas Coals—Prof. Henry Wurtz, 12 Hudson Torrace, Hoboken, N. J. 10
Architect and General Gas Engineer—William Farmer, 111 Broadway Room 95..... 5
American Gas Works Construction and Supply Company—61 Broadway, N. Y..... 3
Cements—S. L. Merchant & Company, 76 South st., N. Y...
Contractors for Gas Works, Etc.—Murray & Baker, Fort Wayne, Ind..... 2
Fodell's System of Bookeeping—A. M. Callender & Co., 42 Pine st., New York.....10
Gas Engineer—B. E. Chollar, 914 Olive St., St. Louis, Mo... 6
Gear Wheels—Scott, 98 Chambers St., N. Y..... 5
Gas-Light Company of America, 63 and 64 Drexel Building, New York..... 2
Kidd's Gas Consumers Guide—A. M. Callender & Co., 42 Pine Street, N. Y..... 4
Massachusetts Institute of Technology—Samuel Kneeland Boston, Mass..... 3
National Coal Gas Company—H. P. Allen, 4 Warren street New York..... 6
Retort Setting and Working—E. S. Cathels, Montreal, Can. 8
School of Mines, Columbia College, East 49th st..... 9
Screening Shovels—O. R. Butler, 126 Maiden Lane, N. J.... 7
Scientific and Practical Chemist and Geologist—Profetsor Henry Wurtz, 12 Hudson Terrace, N. J..... 2
Screening Shovels—G. W. Dean, 1358 Broadway, N. Y..... 1
Springfield Gas Machine—Corner Canal and Centre St..... 1
Slade's Automatic Fire Governor—Jas. Slade, Gas Works, Yonkers, N. Y..... 4
Scotch Fire Brick—S. L. Merchant & Co., 76 South Street, corner Maiden Lane, N. Y..... .....

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WEDNESDAY, DECEMBER 16, 1874.

WISHING TO MAKE THIS JOURNAL an organ of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, the publishers solicit letters from all among them who make the study of these subjects a pleasure, or a profession.

Subscribers would confer a favor upon us by remitting *CHECKS*, or *POST OFFICE MONEY ORDERS*, as we are frequent losers where money is enclosed in letters.

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CONTENTS.

☞ An asterisk (*) denotes an illustrated article.

Second Annual Meeting of the American Gas-Light Association..... 221
Subsidence of the Thames..... 223
The Production of Peat in Germany..... 224
Chemical Excerpts..... 224
Gas Stoves and Kitchen Ranges..... 225
New York City Estimates fo. 1875..... 225
Potable Water..... 226
The Columbia Conduit Company..... 226
Safety Lamps..... 226
McKean County Coal..... 227
Breeze coke..... 227
Gas on German Railroads..... 227
A Knowlu Engine..... 227
EDITORIAL—
Further on Our New Haven Trip..... 228
The Petroleum-Gas Question..... 228
Gems and Generalities..... 230
The Gas War in Detroit..... 230
Coal and Petroleum in Texas..... 230
Aero-Steam Engine..... 230
Bosh..... 230
Gas-Refuse and Fiso..... 230

FURTHER ON OUR NEW HAVEN TRIP.

[In the last issue, we broke off, while speaking of the convenience of the location of these works, in regard to disposal of refuse lime, and so on.]

Superintendent Cox informed us of the interesting fact that the oil from the coal-tar floating on the surface of the tide had proved a complete protection from the ravages of the teredo, not only in the wharf piles of the company, and of neighboring wharves, but that the logs of an extensive sawmill near by were saved from injury to the extent of some thousands of dollars annually, by the same agency.

It is doubtless not generally known that an important investigation has been undertaken, by Prof. Silliman, at these works, with a view to the removal of ammonia, with other impurities, from crude gas, without washing. The results already attained are valuable, and we shall have something to say on this most important matter before long. The policy of obtaining a large volume of gas by the use of high heats and an abundant supply of enriching coals, has been carried as far perhaps in these works, as it is safe to carry it.

We saw a new dry tar-scrubber lately erected by this company, from drawings by Mr. Farmer—the iron work, very neatly executed, by Herring & Floyd. The plan and theory on which this scrubber has been erected are correct no doubt; that is, that an extended surface of coal-tar will absorb naphthaline. We found the temperature of this apparatus much higher than, as we understood, it was expected to be (150° at the inlet, to, say, 115° at the outlet) probably considerably higher than it ought to be. But the complaints of naphthaline stoppages were said to have virtually *fallen off altogether* since it came into use, some six weeks since, having been, during this season last year, very numerous and troublesome.

Naphthaline is beyond doubt a *secondary* product of high heats, and is formed at the expense of the most valuable constituents of the gas—the rich illuminants, and when once formed is constitutionally incapable of being again transformed into illuminating gas. It is therefore a thief and a pest, and its production must be avoided as far as possible. But as some of it is always liable to be formed, the new dry tar-scrubber of Mr. Farmer, prepared at the suggestion of Professor Silliman, is no doubt on the right road to progress; a mitigant if not a cure of a serious evil, if used with the knowledge and judgment that practice will bring about.

Our friends at New Haven do not yet arrogate to themselves perfection in gas-making, but they deserve certainly the praise of an intelligent appreciation of the difficulties attending our art, and of the value of science, and especially of chemistry, to solve these—and, moreover, they have shown the wisdom of a decided policy, and of a willingness to expend the capital needful to put themselves in the front rank of advanced companies.

In our walks by night along the streets, we remarked the very inadequate number of street lamps, which are few and far between, compared to those in many towns of far less wealth and intelligence. This certainly is no fault of the gas company, and must be that of the city government.

We are gratified to find on inquiry that the sales of gas in New Haven have been well maintained during the dull times of the past year and a-half or more. There has been even a slight increase in 1874 on 1873, notwithstanding the closing of many manufactories by night.

The system of records in use at New Haven, in all departments of make, distribution, and sale of gas, is highly adapted to exhibit the workings of the whole business, and has obviously been carefully studied and wisely matured.

This company we understand contemplate at no distant day, other and important improvements, looking to better results—especially in purification—and to bring all parts of their plant to a more perfect symmetry. We believe that we rightly understand ourselves to be at liberty to state, that the New Haven Company, which has purchased the patent right of the "National Coal-Gas Company," covering what is known as the "Gwynne-Harris process," for making water-gas; purpose availing themselves of its advantages, in connection with some plan of enrichment with petroleum or naphtha-gas, at an early day—or as soon as they can determine on the merits of the different plans for such enrichment that are now urged upon the gas public.

THE PETROLEUM-GAS QUESTION.

In our last, a commencement was made in the presentation of figures, bearing upon several of the divisions of this question. These divisions may, for precision in our future discussion, be stated as follows:

1. The sufficiency of our supply of the mineral oil, in the immediate future.
2. The substantial permanency of the supply in the further future.
3. The reliability as to cost in the future.
4. The value of the crude oil and its educts, for gas purposes.

These seem to cover the most important practical points.

Let us then plunge now at once into the first subject, and ascertain what we have that is absolute and reliable. Anxious to arrive at certainty—as closely as may be—we have spent such time as has been so far practicable in searching out authoritative figures relating to the oil trade and production; and we must say the results have been—some of them—rather surprising.

Thus: all the world has heard of the strenuous efforts that have been made, so often of late years among the oil-producers, to combine upon closing wells, and repressing the production in every way possible; and it is, we believe, confessed on every hand, both by bulls and bears, that much has been accomplished in this way; that is that the production would now have been far larger even than it really is, had no such means been adopted; but what is surprising to us is that the overdoing of the thing had been so enormous, that all these efforts have but served slightly to mitigate the evil; and that the overproduction, in spite of them all, has gone on, and is clearly, as we must conclude, beyond the power of any man or combination of men or capital, ring, or other power, to control with any permanency whatever. What else can we conclude from the following figures, which we get from the Annual Report of the Petroleum Committee of the New York Produce Exchange—

Surplus stock in U. S.	Barrels.	Price ₱ gal
At close of 1872....	870,000	12.8 cents.
" 1873....	1,948,919	5 3 "

This notwithstanding the immense increase in foreign exports, of oil during 1873, which was such as to astonish the world.

But we have gone still further. Information obtained from one of our best informed men in the oil trade, of a class of men which does not depend upon information upon loose newspaper

reports, mainly from interested sources, but which has its private and strictly reliable sources of knowledge, to furnish data for large mercantile operations.

We thence learn that during the current year 1874, in spite of another increase of consumption and exports of a round million of barrels, there has actually been such an increase again of aggregate production—amounting to three millions—that there will be a further surplus of over two million barrels to be carried over to the account of 1874, making a total expected surplus in the country on January 1, 1875, of *four million barrels*. This bulk of oil, now awaiting consumption, would alone make all the candle-power for all the existing gas works in the United States for at least three years!

In order that no reader may imagine that we are bent on cramming him with figures "against the stomach of his sense," we shall add that before the next issue we have every reason to anticipate having the detailed figures for 1874, showing the progress of this extraordinary phenomenon. We are informed—a little *sub rosa*—that the result has been that millions have been lost by some of our oil magnates–those on the "bull" side of the house of course. A ring, far reaching in its operations, was formed, to reduce production—fewer wells were at one time sunk, and all was done that capital and ingenuity combined could contrive; yet the price of oil has still fallen, and the fact looks us in the face, of this enormous surplus stock remaining on hand unsold.

The capatalists concerned cannot keep up the game, and cannot carry so heavy a load. Nor can the producers—as experience shows—for any length of time keep back the production. The combinations all fail, and the idea that doubtless has its influence on the minds of many of the gas-profession, that corners in petroleum will have a disturbing influence on their business, should they use this enricher, can, we must conclude, be now very safely cast to the winds.

Our second point, as to the continuance of supply for a series of years, or of decades, in the future. As we remarked in the last issue, this does not seem very essential to the establishment of our main position, that petroleum should be introduced into our gas works freely as a material; for it would be highly unreasonable to claim that any sudden or cataclysmic change, is going to occur in the present sources of supply, or in the modes of consumption, adequate to produce any rapid effect on the available supply for gas. There will be ample warning, when, if ever, an abandonment is called for, and an exclusive use of coal again indicated.

But it may be well to refer, under this head, to a few considerations bearing upon it. West Pennsylvania is not the only oil-bearing region of the United States. We are told that in West Virginia, for example, there would be no difficulty whatever, if they could obtain even two dollars per barrel, in running their production up to five thousand barrels per day, while now their product is but one or two hundred. There are also extensive, old, and well-known, but undeveloped oil-fields, in Kentucky, Tennessee, Ohio, California, Texas, and, some assert, in other states. Going outside of the United States, we have the Canada oil-fields, developments of immense extent in the West Indies, Honduras, and in Peru and other States of western South America. From Peru we hear of petroleum gas-works being well under way.

The Pennsylvania wonders have led to new efforts on other continents to develop great oil-fields, as in Galicia, and different parts of the Russian Empire. It seems likely, from the copious Russian developments we hear of, that before long a large part of our own European and far-eastern markets may be wrested from us.

In this connection, we would only add the hint, that it is very certain that the more gas we make from petroleum, or rather the more we use it to improve the quality and reduce the cost of gas, the more we detract from its now well-developed and increasing power to *displace* gas, and diminish gas-consumption. The gas fraternity will seriously find that if they cannot kill this snake, they can to a large extent "scotch it."

This latter consideration bears on our third point, that of reliability as to future cost. This point, we opine, however, will be chiefly governed by future developments in new modes of utilzing or consuming petroleum; and, above all, in its utilization for purposes of fuel in divers arts. We still adhere to the idea we formerly threw out, that where it is found practicable to make gas from petroleum, it will also be found so, to heat the gas retorts with it. But this is a collateral development which we need not—in fact could not—at present discuss.

The fourth point, the exact valuation of crude oil, and its important educt, *naphtha*, for gas purposes. Here we have some light already, much of it propagated, though we can scarce say originated, at the late meeting of the Association. It is nevertheless undeniable that there is much conflict and incompatibility of statement and of opinion on this part of the subject among those entitled to speak with more or less authority. Mr. Edgerton spoke of naphtha as yielding the equivalent of 400 feet per gallon, of 16 candle-gas; whereupon Mr. Harrison, the Treasurer of the New Haven Gas-Light Company, very acutely pointed out that Captain White and Mr. Libby had vouched for the production per gallon of at most 140 feet of 16 candle gas. Mr. Edgerton's ensuing explanation seems certainly insufficient; without admitting some powerful effect on the part of the water-gas used as a diluent, in actual extinction of candle-power, similar to the known effects of air and carbonic acid.

These important fundamental points, of the quantity and quality of petroleum and naphtha-gases, from given quantities of material, and the results of mixing, diluting and compounding with different other gases—with which also is appropriately included their permanency, under the influences of time, cold, water, etc., are legitimate subjects of chemical investigation and of that only. It gives us pleasure therefore to state that it is proposed the writer should have—probably in conjunction with other chemists of distinction, an immediate opportunity to submit all these matters to careful and exhaustive chemical examination, and to communicate the results at once to the profession, in such shape that all dubious and obscure points will be cleared up.

BUTLER'S COKE SCREENING SHOVELS.—Mr. Butler, so long identified in the manufacture of coke screening shovels, we are informed, has reduced his Patent Coke Screening Shovel from $48 to $40 per dozen. He offers the "Sabbaton Shovel," as made by him for many years, at $32 per dozen.

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A YOUNG MAN OF LIBERAL EDUCATION, WHO HAS spent many years in the study of gas, and working in a large gas works, desires a situation as Superintendent of a works making 10,000 to 50,000 cubic feet daily. Has good reference as to ability; or would act as Assistant in large works. Would prefer a situation on the staff of a gas works builder—draws well, and has experience in setting up apparatus. Address, stating salary, C. P. V., care of W. B. CARPENTER & Co., Cincinnati, Ohio. 372

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and used in connection with the celebrated

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HAVING JUST RECEIVED FROM MR. E. S. CATHEL a fresh supply of his CAS CONSUMERS MANNAL AND RETORT SETTING pamphlet, we can now fill all orders for the same at once. Mr. Cathels has decided to reduce the price to correspond with the times, therefore for the future either of the above works will be forwarded, post paid, for **25** cents, or one of each for **50** cents. Send all orders to A. M- CALLENDER & CO
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Gems and Generalities.

In a sort of hurricane at Trenton November 23, the water was skimmed from the city reservoir and washed over the banks in large quantities, doing a good deal of damage to the property of the water works, and to the buildings in the vicinity.

Parisians eat "Oleomargarine," though with a good deal of *pain*.

An old gentleman used to say that any young man with good health and a poor appetite could save up money.

At this season you can shoot what you like—except Barnum's big rhinoceros and your mother-in-law.

The total destruction of a fine residence in Syracuse, on the evening of the 92th November, is attributed by the *Journal* of that city to the want of a sufficient water supply.

A Nevada mining district is suggestively named the Golden Fleece.

Estimates put the yield of the precious metals this year in Utah at $10,000,000, against half that amount last year. O Emma mine!

Within fifty miles of San Diego, Cal., there are now being worked not less than twenty-three well-defined gold mines. In 1869 not a mine was worked in the county.

The Eureka mines in Nevada are turning out bullion at the rate of nearly six hundred thousand pounds a week.

It is said stove-pipes fit uncommonly badly this season, and demonstrate anew how much missionary work remains to be done at home.

By decree of the Board of Health, the slaughter of cattle in New York must be discontinued after one year from the 1st of January next.

Can the Board of Health do nothing to prevent or mitigate the stench which comes up from the East River with such frequency of late, and makes Murray Hill reek with a foulness which Water street could hardly surpass?—*Weakly Idiot.*

[Of course they "can do nothing," unless they immediately remove the East River—also the Gas Works, and while they are about it, the sewers likewise—outside the city limits. Let the Smelling Committee look to it at once."—Ed.]

A company has been formed in Constantinople to supply that city with water from the Lake of Ducos, thirty miles away.

The latest invention in the way of bank safes is one contrived to asphyxiate burglars by the generation of carbonic acid gas, immediately on any attempt to open it illegitimately.

Balance of Trade.—From England we import much, both good and bad. In 1870 mosquitoes made their appearance in that country, imported, as it is alleged there, from the United States, and they have now so much increased as to become a general nuisance.

Credat Judaeus.—Chignon is dead. The great deity of the feminine toilet is no more. Paris has given it up for the sake of economy! It was very costly. Every year there was taken into Paris 110,000 pounds of human hair in a "raw" or unworked state—worth $680,000, and to be made into chignons. Now all that money can be spent in some other nonsense.

The Gas War in Detroit.

[To this subject we have heretofore made but little reference, knowing nothing except from hearsay. We have now a Detroit journal, from which the following editorial is extracted. If space allow, we shall introduce hereafter further information, with which we have recently at last been supplied, about this affair. —Editor.]

"A few years ago Detroiters had to pay $5.50 per thousand feet for their illuminating gas. Then the Mutual Gas Company began operations, and the price gradually came down by force of competition to $1.75. Consumers thought themselves lucky. But it seems at this rate neither company has been earning anything for its stockholders; and hoping for nothing so long as the competition should continue, a policy has been inaugurated on both sides, by which one company or the other must be driven from the field, or compelled to sell out to the other This policy consists in putting the price of gas at so low a figure as absolutely to entail loss in the manufacture, whereby it only becomes a question of time when one company or the other will be bankrupted. Thus the Mutual company announce a reduction to $1 per thousand, and the Detroit company follow suit with a reduction to 50 cents.

Now, this may at first be supposed to concern only the stockholders, but upon a moment's reflection it will be seen that the public have a very deep interest in the matter. While for a few months, during the progress of the contest, consumers get the benefit of cheap gas, it must be remembered that such ruinous competition is the direct road to the worst kind of monopoly. As soon as one company is driven from the field, the survivor immediately proceeds to make good its losses in the high rates it is able to impose. Nor does it stop with simply reimbursing its exchequer. It gets a taste for large profits and provides for possible future competition "by making hay while the sun shines." And thus, as an offset for a few months of cheapness, the public are bled heavily for as many years. Regarding the matter in this light Detroiters may look out for dear gas for some years, as the outcome of this disastrous competition.

"We allude to the matter for the purpose of calling the attention of our city authorities to it, and asking if it be not competent for our common council to fix and enforce a price for gas, placing it at such rates as shall remunerate the companies for its manufacture, and compelling uniformity the city over. By some such means only can our citizens be protected against the monopoly which must follow the ruin or absorption of one of the competing companies. We trust at the very next meeting of our city fathers the city counsellor will be instructed to investigate and report on the subject."

Coal and Petroleum in Texas.—The coal-bearing rocks of Texas occupy an area of not less than 6000 square miles, embracing the counties of Jack, Young, Palo, Pinto, Eastland, Brown, Comanche, Callahan, Coleman, and extending to the territory of Bexar. The rocks possess the characteristics belonging to the coal measures of Missouri and other Western States. In general appearance this coal resembles that of Belleville, Ill. The analysis gives: Fixed carbon, 52 per cent; volatile matter, 36 per cent.; ashes, 3 per cent. It cokes with a great flame, without changing its form. The development of this valuable mineral is destined to be of great importance to the State. Anthracites, lighter and more brittle than those of Pennsylvania, have been found in various parts of the State, but I had no opportunity to visit the localities. Lignites, tertiary, and other coals of more recent origin, occupy an area of 10,000 square miles—in connection with the true formation—at many points on the Rio Grande, in Webb, Atoscosa, and Frio counties. They are mostly soft, sulphurous and ashy, but superior to German brown coals. Petroleum springs occur over a space of about 50 square yards in Hardin county, and it is probable that large supplies may be obtained by boring.—*Iron Age.*

Aero-Steam Engine.

Mr. Richard Eaton's paper on the use of heated air combined with steam in locomotives, read before the British Association, has attracted considerable attention. The principle was invented by Mr. George Warsop, and a stationary engine on this principle was in daily work at the International Exhibition of 1871. In the case of the locomotive named, an air pump, single acting, driven from one of the main cross heads, and secured to the frame work of the engine, in the place originally occupied by the feed pump, conveys a continuous supply of air, taken from the atmosphere, in its natural state, through a coil of pipes, fixed in the smoke box, into the boiler, at an average temperature of about 650° Fah. Within the boiler, the heated air is distributed and is continually rising, scattering the cohesion of the molecules of water, increasing the heating surface, promoting ebullition, joining the steam on its passage to the cylinder, and there greatly aiding the energy of the steam by retarding condensation, and following a higher curve of expansion. The action of the heated air also prevents a permanent settlement of incrustation on the boiler, the fire box, or tubes, entirely obviates priming, and diminishes the liability to explosion. The duration of boiler, tubes, and fire box is prolonged by the non-deposit of scale; and steam is more quickly generated and more easily kept up.—*Sci. Press.*

Bosh.

The condition of popular knowledge in this country is illustrated in the following item, going the rounds of the newspapers. We get it from a Journal published in the oil country. The last sentence contains good advice:

The manufacture of illuminating gas from water has not been heard much of lately, but now has come an English inventor who makes an illuminating gas from sewage water, forty-seven feet of gas being obtained from one quart of sewage water. One foot of sewage gas gives as much light as three feet of coal-gas, and the flame is much clearer, purer, more healthful, and cheaper. The process consists in passing the liquid through two heated retorts, then through an iron cylinder called the hydraulic main, which is above the furnace, then through another heated retort, and next through a coil of metal piping immersed in cold water. Afterwards the process is the same as in making coal-gas.

Recent investigations have raised grave doubts as to the propriety of using sewage as manure, the vegetables raised by its means proving unhealthful. If we can light our streets and houses with the contents of the sewers, the great problem of what to do with the sewage of great cities is in a fair way to be solved, but it will not do to be too sanguine.

Gas Refuse and Fish.

Wagner, of Munich, has recently found that fish put in water to which 1 per cent of "gas refuse" (?) had been added, became at once very restless, tried to jump out, turned on their backs after they had been in the polluted water one minute, and were dead after the lapse of six minutes. In water containing one-half per cent. or one-quarter per cent., the fish were killed in half an hour and an hour and a half respectively. One tenth per cent. killed them in seven hours.

Wagner recommends that, instead of throwing the refuse into streams in quantities at a time, it should be allowed to flow in very gradually, at a rate not exceeding five quarts per minute. By this means these small amounts would be at once diluted to such an extent as to be comparatively harmless, chemical decomposition of their elements in the river water setting in at the same time; and then injurious influences on pisciculture need no longer be feared.

[Ammoniacal liquor is doubtless referred to.—Ed.]

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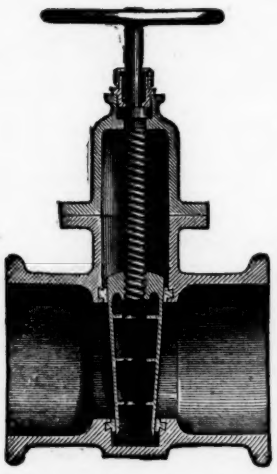

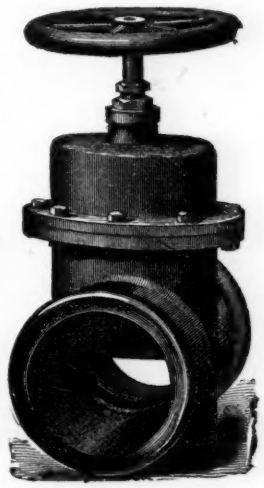

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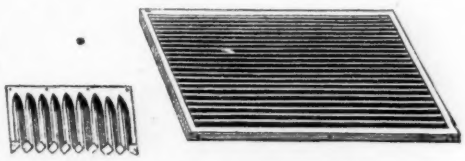

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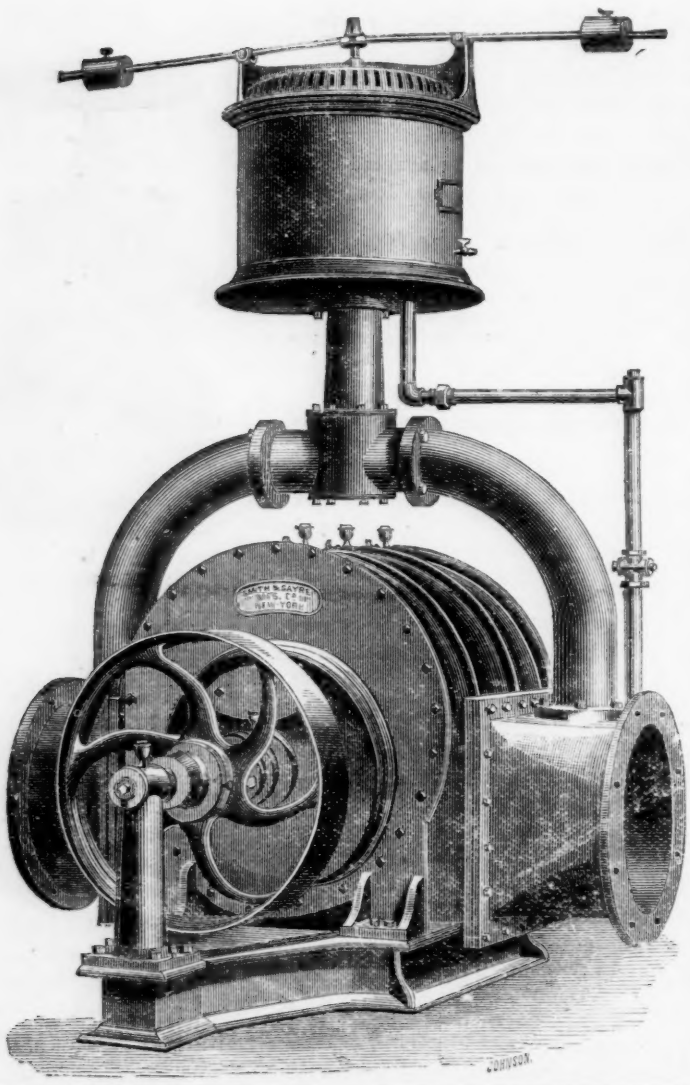

They are made to pass from 4,000 to 150,000 cubic feet of gas per hour; will increase the production and illuminating power of the gas, and add very much to the durability of the retorts, either clay or iron. The Compensator obviates entirely the necessity of water-jo ints, is compact, durable, cleanly, not liable to get out of order, self-acting, quiet, and certain in its operation.

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Pictou			2 50
Block House—At Mines, $2 12, Gold			0 00
Caledonia—At Mines, $2 00, Gold			0 00
Little Glace Bay—At Mines, 1 87½, Gold			2 00
Lingan—At Mines, $2 25, Gold			0 00
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Murphy Run	$7 40	@	0 00
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American Gas Coal	7 40	@	0 00
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Peytona of West Virginia	$12 50	@	00 00
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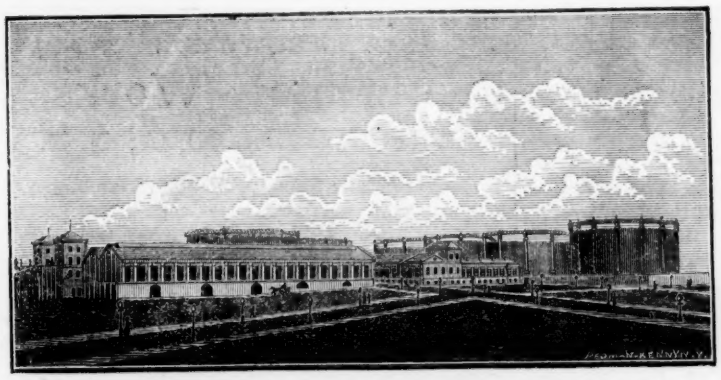

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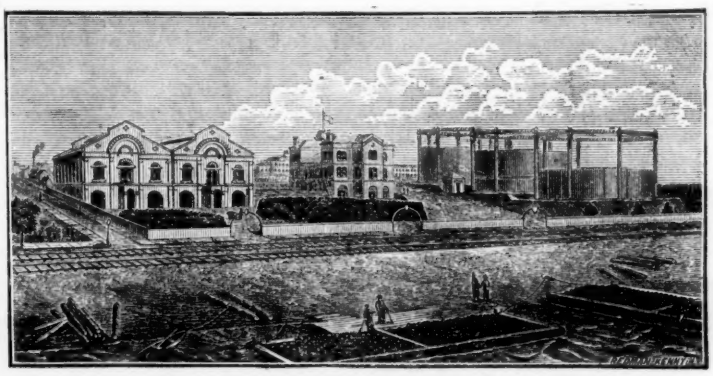

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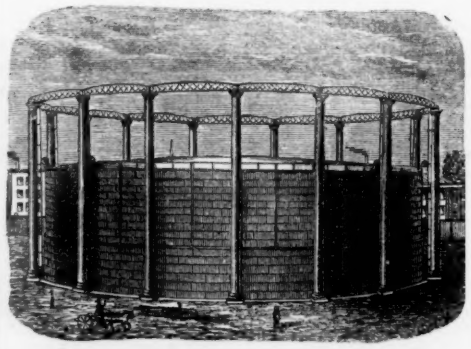

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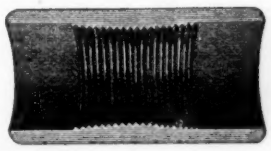

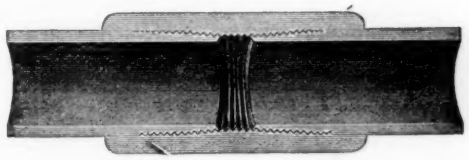

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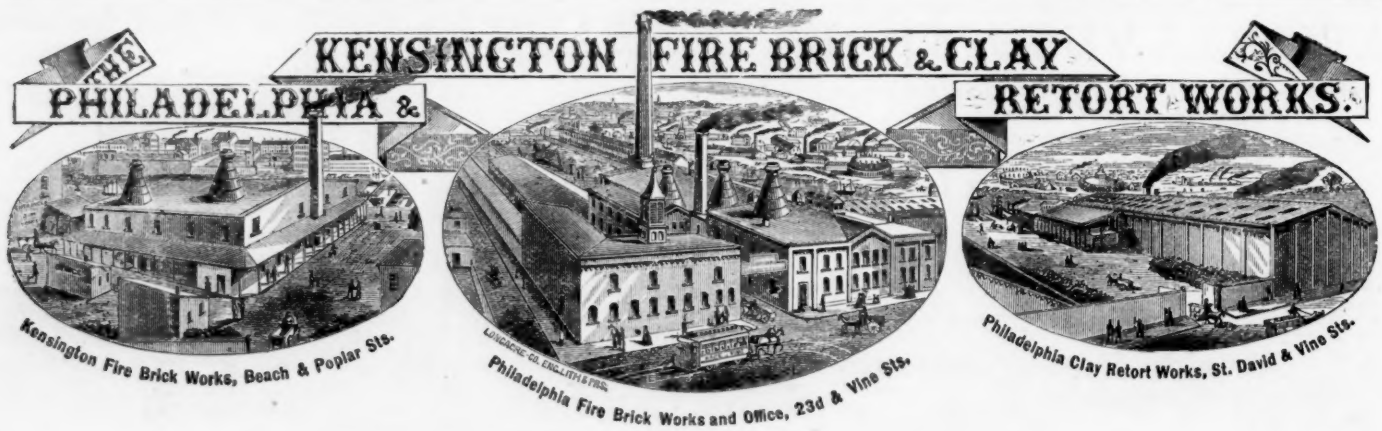
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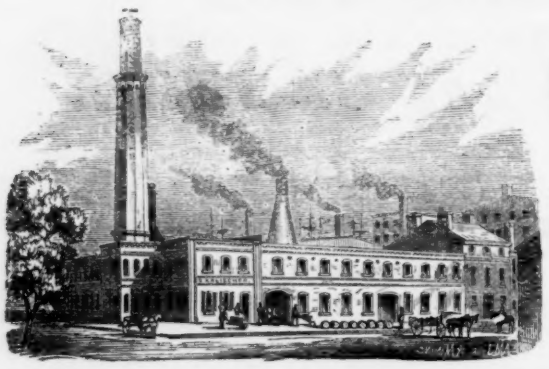

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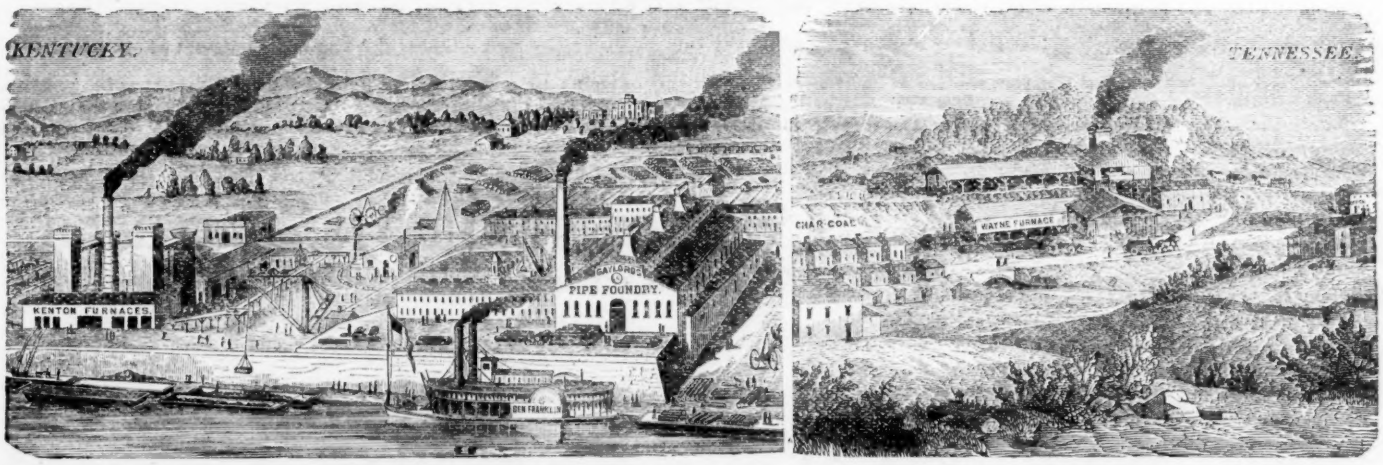

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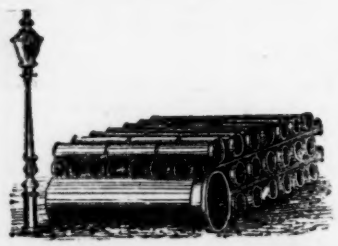

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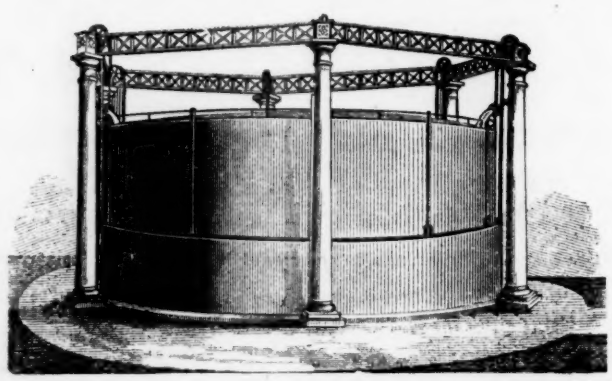

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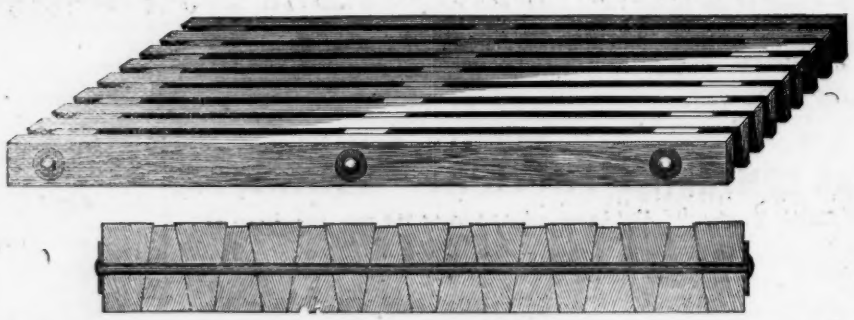

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